Exercises for Module 4 - Design

EXERCISE 1: Baseline & Contextual Needs

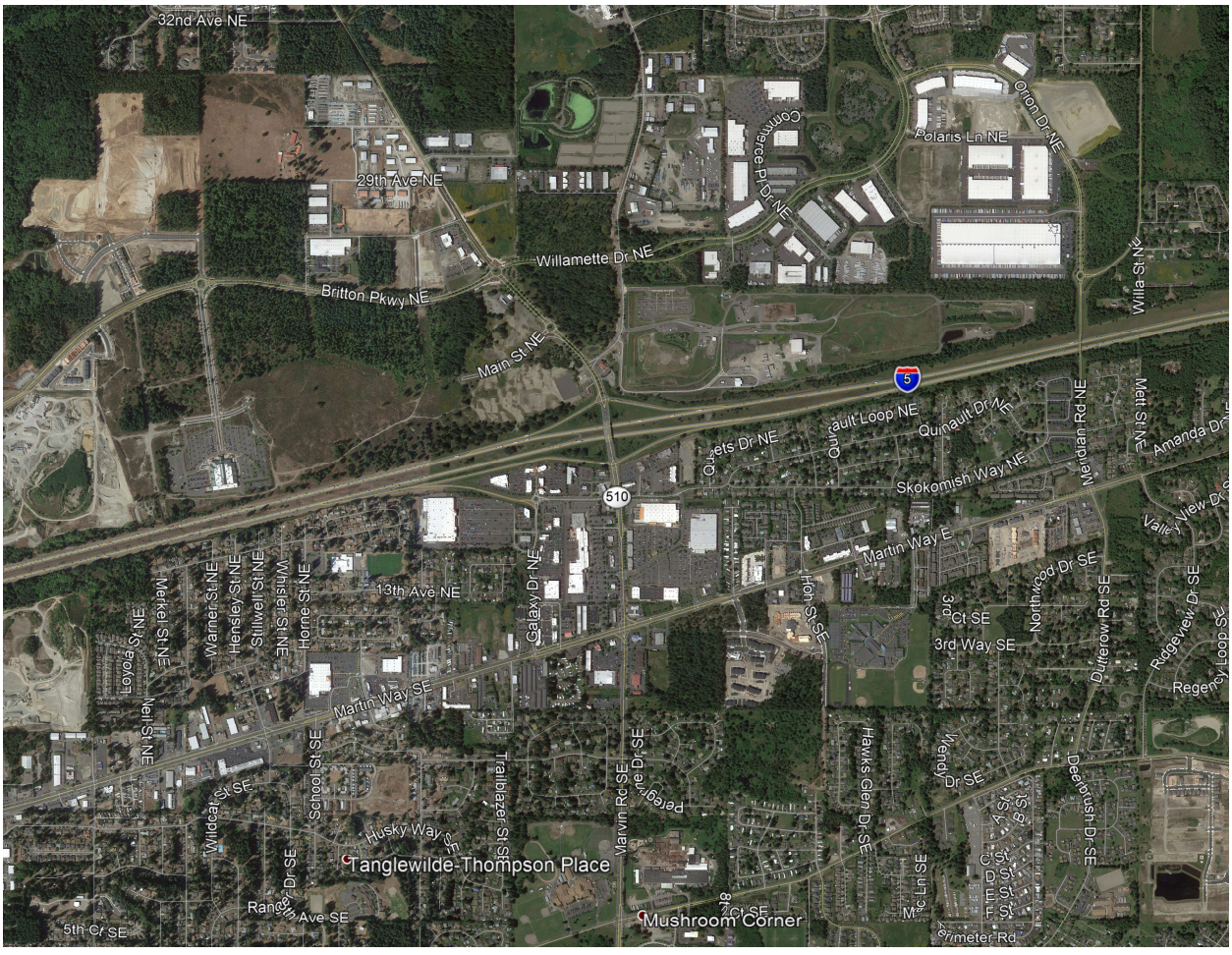
Using the example of the Diverging Diamond Interchange:

- Get into small groups
- Each group identifies 2-3 baseline needs & 2-3 contextual needs
- Present identified baseline needs and contextual needs

Exercise 1 for Module 4: I-5/SR 510 Interchange – Reconstruct Interchange

General Project Information						
	SR	**NHS (Y/N)**	**Functional Class**	**Current Posted Speed**	**Truck %**	**Current ADT**
Route Information	510, I-5	Yes (I-5) Yes (SR 510, South of I-5 SB ramp terminal)	I-5 – Urban Interstate SR 510 – Urban Other Principal Arterial	I-5 - 60 mph SR 510 - 35 mph	I-5 – 5% SR 510 - 5%	I-5 – 90,000 SR 510 - 35,000
	Begin MP	**End MP**	**Sub-Program**	**County**	**Within City?**	**Funding**
	I-5 – MP 110.14	I-5 – MP 112.50	I-1	Thurston	Lacey, WA	Connecting Washington
Project Information	**Existing Access Control**	**WSDOT Planned Access Control**	**Project Proposed Access Control**	**Project Delivery Method – Probable**	**Project Delivery Method - Final**	
	Full	Full	I-5: Full Interchange Crossroad: Full & Modified	Design/Bid/Build	Design/Bid/Build	

Exercise 1 for Module 4: I-5/SR 510 Interchange – Reconstruct Interchange

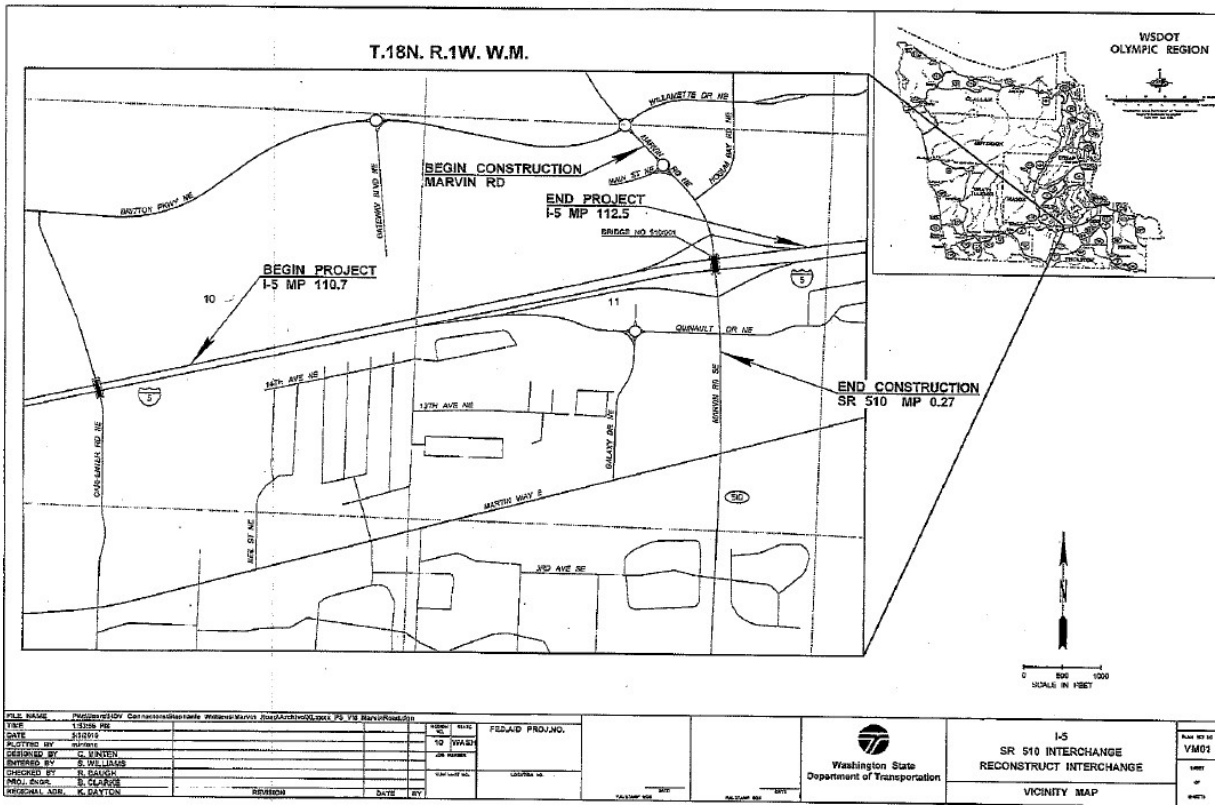


Exercise 1 for Module 4: I-5/SR 510 Interchange – Reconstruct Interchange

Section 2) Context	
Land Use Context (existing and future)	The surrounding area is primarily semi-urban to the south and rural to the north. There is planned development northwest of the interchange. The Lacey Gateway Town Center is a planned commercial development, which has City of Lacey and environmental approvals. Refer to the *I-5/SR 510 Interchange Project – Interchange Justification Report Amendment Sept, 2017)* Policy Point 5 for additional discussion on land use. The project was found to be consistent with planned land use proposed by the City of Lacey and documented in both the City's comprehensive plan and the 2040 Thurston County Regional Transportation Plan. Land Use Categories are a combination of Rural and Urban.

Target Speed	SR 510 (Marvin Road) = 35 MPH, Collector-Distributor Road = 50 MPH Frontage Road = 40 MPH On Ramps = 50 MPH Off Ramps = 45 MPH

Transportation Context (existing and future)	The I-5.SR-510 Interchange is the primary access from I-5 to the Hawks Prairie area in Lacey. No significant change in Transportation Context is anticipated. Roadway Type: Interstate 5 (Freeway), SR 510 (Principal Arterial) Bicycle Route Type: Neighborhood Connector Pedestrian Route Type: P-3 Freight Route Classification: R1 for Interstate 5. N/A for SR 510 Transit Use Considerations: Local Routes Main Streets Design: N/A



EXERCISE 2: Design Controls & Design Elements

Using the example of the Diverging Diamond Interchange:

- Identify 2 design controls & 2 design elements that would impact project design
- Group discussion

ANSWER KEY for Exercise 1 from Signed BOD:

Baseline:

List the project's BASELINE NEED(S). Include the performance metrics that will be used to evaluate alternatives and the performance targets for those metrics.	Project Need Statement: Approved development in the I-5/SR 510 (Marvin Road) area and regional growth through the year 2025 is projected to severely impact travel times, community connectivity, freight mobility, motorist safety and future economic development. BN1: Mobility M1: Enhance connectivity by improving access and reducing per person delay for the Design Year 2025 in the I-5/SR 510 (Marvin Road) interchange area. T1: Reduce per person delay to 25 seconds. M1: Reduce queue lengths and improve LOS for Design Year 2025 in the I-5/SR 510 (Marvin Road) interchange area. T1: Improve to LOS C. BN2: Economic Vitality M2: Promote economic development by supporting local and regional land use planning. T2: Increase access for approved surrounding development. M2: Connect interstate with local freight transportation network. T2: Provide a dedicated lane from I-5 SB off-ramp to Hogum Bay Road. BN3: Safety M3: Reduce number of serious injury and fatal crashes for all modes of transportation. T3: Reduce serious injuries and crashes by 2.7 per year; achieve a CRF of 41%.

ANSWER KEY for Exercise 1 from Signed BOD:

Contextual:

List the project's CONTEXTUAL NEED(S). Include the performance metrics that will be used to evaluate alternatives. List performance targets for the metrics, if applicable.	The City of Lacey is a growing urbanized area in Thurston County, WA with existing and future development planned on both sides of the Interstate 5 (I-5) corridor. The City of Lacey, as well as other neighboring cities and Thurston County, are encouraging new developments in the area to create jobs and improve the quality of life. This growth has been anticipated by the City of Lacey and other communities in Thurston County. Together, they have invested significant resources in planning and developing the local transportation infrastructure necessary to help accommodate this growth. CN1: Environment M1: Minimize project footprint to protect natural habitat, water quality and Nisqually Tribal Trust Land. T1: Zero (0) encroachment on wetlands or Nisqually Tribal Trust property. CN2: Preservation M2: Build strategic investments; achieve the broadest benefits within existing assets. T2: Use existing bridge structure and add no new structure inventory.
	CN3: Other M3: Constructability T3: Achieves baseline needs while on time and on budget. M3: Ability to stage the project to reduce traffic and business disruptions during construction. T3: During construction, maintain existing LOS D and avoid closure of business approaches. M3: Adaptability T3: Provide a modifiable interchange that accommodates future growth.

ANSWER KEY for Exercise 2 from Signed BOD (Design Elements):

Section 5) Design Element Selection

For each design element below, identify whether or not the design element is included in the preferred alternative for each alignment or location. You can group alignments into a single location if desired. You may need to add or delete columns.

Design Element	SR 510 (Marvin Road)	I-5 Mainline	I-5/SR 510 Ramps	C-D and Frontage Roads	Quinault Dr NE	Alignment #6
Alignments	MRE & MRW Lines	LL & NB Lines	ANE, ANW, BN, BNE, BNW, CSE, CSW, DES, DWS Lines	CD, DWS, DS, GTA, GTB, GTC, GTD Lines	QW Line	
1. Lane	Yes		Yes	Yes	Yes	
2. Median / Buffer	Yes					
3. Shoulder	Yes	Yes	Yes	Yes		
4. Streetside / Roadside Zone	Yes					
5. Pedestrian Facility	Yes				Yes	
6. Bicycle Facility	Yes	Yes				
7. Bridges	Yes					
8. Horizontal Alignment	Yes		Yes	Yes		
9. Vertical Alignment	Yes		Yes	Yes		
10. Cross Slope	Yes		Yes	Yes		
11. Side Slope	Yes	Yes	Yes	Yes		
12. Clear Zone	Yes	Yes	Yes	Yes		
13. Barrier, Guardrail & Rumble Strips	Yes	Yes	Yes	Yes		
14. Signals, Illumination, and ITS	Yes	Yes	Yes	Yes	Yes	
15. Signing and Delineation	Yes	Yes	Yes	Yes	Yes	
16. On/Off Connections		Yes	Yes			
17. Intersection / Ramp Terminal	Yes				Yes	
18. Road Approaches	Yes		Yes	Yes		
19. Roundabout	N/A	N/A	N/A	N/A	N/A	
20. Access Control	Yes			Yes		